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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Michael J. Berman

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EXAMINER

KOBERT, RUSSELL MARC

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/723,701

Applicant(s)

BERMAN ET AL.

Examiner

Russell M. Kobert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2005 and 24 January 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show “a round substrate mountable in a contact ring” and “resistance measurement circuitry on the substrate and surrounded by the conductive pattern” as described in the specification. In Figure 1, it is not clearly shown what the boundaries of ring 20 are, nor is it understood how device 30 and/or substrate 32 fit in this figure. With respect to the resistance measurement circuitry on the substrate, as best understood, Figure 2 shows a substrate 32 bounded by an outer circular dimension and an inner circular dimension. The “resistance measurement circuitry” 38 appears to exist out of bounds of substrate 32 as if it is “floating in open space” with wires 36 holding 38 in some spatial relationship. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet”

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pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(b) because they are incomplete. 37 CFR 1.83(b) reads as follows:

When the invention consists of an improvement on an old machine the drawing must when possible exhibit, in one or more views, the improved portion itself, disconnected from the old structure, and also in another view, so much only of the old structure as will suffice to show the connection of the invention therewith.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81(c). No new matter may be introduced in the required drawing. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). The claims refer to a round substrate mountable in a contact ring; the drawings fail to show how this is accomplished. As a for instance, Figure 4b shows a contact ring 20 and a substrate 32. It is not apparent how substrate 32 can be mounted in contact ring 20 because conductive pattern 34 is located at the uppermost boundary of substrate 32 and electrical contacts 22 are located at the lowermost boundary of ring 20. As best understood from the drawing, one having ordinary skill in the art can only position the substrate on the contact ring.

4. The drawings are objected to under 37 CFR 1.83(a). **The drawings must show every feature of the invention specified in the claims.** Therefore, the "round substrate in a contact ring" (see claims 1 and 12), the "resistance measurement circuitry on the substrate and surrounded by the conductive pattern" (see claims 1 and 12), the "resistance measurement circuitry comprising a battery" (see claim 4), the "resistance measurement circuitry comprising multiplexer circuitry" (see claims 6, 7, 9, 10 and 16) and the "resistance determination circuitry" (see claims

10 and 17) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37

CFR 1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

6. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because of the deficiencies noted supra. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

7. Claims 1-18 are objected to because of the following informalities: It is not clear what a contact ring is. How is "a contact ring" drawn? What qualifies as a contact ring? Additionally, it is not clear how a round substrate is mountable in a contact ring as no figure supports this limitation. Additionally, it is not clear how resistance measurement circuitry is positioned on the substrate as no figure supports this limitation. It is not clear how to interpret "resistance measurement circuitry" because it is not apparent what qualifies as a circuit to meet this limitation. As a for instance, is a pair of simple conductive traces considered "resistance measurement circuitry" because such a configuration can transmit information representative of resistance, impedance, conductance, or any other electrical characteristic? Moreover, the claims are indefinite because of intended use language such as "mountable," "usable," "contactable," and "configured to." Appropriate correction is required.

8. Claim 1 is objected to because it recites the limitation "the electrical contacts of the contact ring" in line 5. There is insufficient antecedent basis for this limitation in the claim.

9. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Akram et al (5894161).

Akram et al anticipates a device and method **for** measuring resistances associated with electrical contacts, the device comprising:

A round substrate (10, 52) such that the substrate is **mountable** in a contact ring (12) *usable* in a semiconductor wafer electroplating process;

A conductive pattern (26) on the substrate, the conductive pattern electrically **contactable** with the electrical contacts (22) of the contact ring;

The resistance measurement circuitry (described by Akram et al as "Wheatstone bridge" as sensing elements 55A; see column 6, lines 43-55) on the substrate and surrounded by the conductive pattern, the resistance measurement circuitry connected to the conductive pattern, the resistance measurement circuitry **configured to** not only send test signals to the conductive pattern, but also **configured to** receive signals from the conductive pattern and measure the resistances associated with the electrical contacts of the contact ring; as recited in claims 1 and 12.

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 2-11 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akram et al (5894161) as applied to claims 1 and 12 above, and further in view of Hirao (6788082).

Although Akram et al does not explicitly show each of the limitations of dependent claims 2-11 and 13-18, Hirao discloses such limitations for use in a probe card.

As to claim 2, Hirao anticipates the substrate is at least one of a silicon substrate and a metal substrate (Metal Plate 102).

As to claims 3 and 13, having the resistance measurement circuitry configured to communicate signals to an external device, the signals relating to resistances to the electrical contacts of the contact ring is considered inherent to the operation of the Probe Card Checker 101.

As to claims 4-11 and 14-18 having a battery to power the resistance measurement circuitry, having input/output circuitry connected to the conductive pattern, having multiplexer circuitry connected to the conductive pattern, resistance determination circuitry and the remaining claimed components and operational characteristics is considered to be within the scope of Hirao.

It would be obvious to one having ordinary skill in the art at the time the invention was made to have combined the teaching of Hirao with that of Akram et al to make the claimed invention because each is used for measurement and test of semiconductor wafers and one having ordinary skill in the art would have been further motivated to combine these teachings because it is desirable to have a probe card that

can test itself for well-balanced current application to a device under test as emphasized by Hirao.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Stopper (4486705) shows structure of Applicants' invention but fails to show resistance measuring.

Williams et al (6114869) show resistance measuring according to Applicants' invention but fail to show the structure.

Sano (5703494) shows a contact ring for electrical contact with a wafer.

Leedy (6288561) shows a probing device having means for reducing oxides on contact pads for probing.

Whitten et al (6476630) shows a method for testing signal paths between a wafer and a wafer tester wherein a parametric test unit within the tester determines resistance within the signal paths.

Hanson et al (6004440) shows a wafer electroplating apparatus having a ring contact structure with contacts for contacting a wafer.

Uzoh (6071388) shows an electroplating fixture having a ring contact structure with contacts for contacting a wafer.

Patton et al (6755946) shows an apparatus and method for measuring impedance of a layer of deposited metal on a substrate and controlling deposition uniformity during electroplating.

Hongo et al (6517689) shows an electroplating device for determining conductivity between contacts.

Nayler et al (6480013) shows method for calibration of characteristic impedances measured from contacts pads using an RF integrated circuit probe having a ring like structure.

Stevens (6251236) shows a cathode contact ring for electrochemical deposition of a substrate during processing using a power supply.

16. A shortened statutory period for response to this action is set to expire three month(s) from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Kobert whose telephone number is (571) 272-1963. For an automated menu of Tech Center 2800 phone numbers call (571) 272-2800.



Russell M. Kobert
Patent Examiner
Group Art Unit 2829
February 1, 2006


PARESH PATEL 02/02/06
PRIMARY EXAMINER